

# Fill in the Blanks

# Inverse of a 3x3 Matrix

| Matrix A                                                               | det A | Matrix of Minors M                                                           | Matrix of Cofactors C                                                         | Transpose of Cofactors C <sup>T</sup>                                         | Inverse Matrix A <sup>-1</sup>                                                                                   |
|------------------------------------------------------------------------|-------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| $\begin{pmatrix} 3 & 1 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{pmatrix}$    | 6     | $\begin{pmatrix} 2 & 0 & 0 \\ 1 & 3 & 0 \\ 0 & 0 & 6 \end{pmatrix}$          | $\begin{pmatrix} 2 & 0 & 0 \\ -1 & 3 & 0 \\ 0 & 0 & 6 \end{pmatrix}$          | $\begin{pmatrix} 2 & -1 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 6 \end{pmatrix}$          | $\begin{pmatrix} \frac{1}{3} & -\frac{1}{6} & 0 \\ 0 & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$               |
| $\begin{pmatrix} 0 & -1 & 2 \\ 2 & 3 & -1 \\ 1 & 1 & 0 \end{pmatrix}$  | -1    | $\begin{pmatrix} 1 & 1 & -1 \\ -2 & -2 & 1 \\ -5 & -4 & 2 \end{pmatrix}$     | $\begin{pmatrix} 1 & -1 & -1 \\ 2 & -2 & -1 \\ -5 & 4 & 2 \end{pmatrix}$      | $\begin{pmatrix} 1 & 2 & -5 \\ -1 & -2 & 4 \\ -1 & -1 & 2 \end{pmatrix}$      | $\begin{pmatrix} -1 & -2 & 5 \\ 1 & 2 & -4 \\ 1 & 1 & -2 \end{pmatrix}$                                          |
| $\begin{pmatrix} 3 & 2 & 0 \\ 4 & 2 & -1 \\ -2 & 0 & 1 \end{pmatrix}$  | 2     | $\begin{pmatrix} 2 & 2 & 4 \\ 2 & 3 & 4 \\ -2 & -3 & -2 \end{pmatrix}$       | $\begin{pmatrix} 2 & -2 & 4 \\ -2 & 3 & -4 \\ -2 & 3 & -2 \end{pmatrix}$      | $\begin{pmatrix} 2 & -2 & -2 \\ -2 & 3 & 3 \\ 4 & -4 & -2 \end{pmatrix}$      | $\begin{pmatrix} 1 & -1 & -1 \\ -1 & \frac{3}{2} & \frac{3}{2} \\ 2 & -2 & -1 \end{pmatrix}$                     |
| $\begin{pmatrix} 1 & -3 & 0 \\ 4 & -1 & 2 \\ 1 & 0 & 1 \end{pmatrix}$  | 5     | $\begin{pmatrix} -1 & 2 & 1 \\ -3 & 1 & 3 \\ -6 & 2 & 11 \end{pmatrix}$      | $\begin{pmatrix} -1 & -2 & 1 \\ 3 & 1 & -3 \\ -6 & -2 & 11 \end{pmatrix}$     | $\begin{pmatrix} -1 & 3 & -6 \\ -2 & 1 & -2 \\ 1 & -3 & 11 \end{pmatrix}$     | $\begin{pmatrix} -0.2 & 0.6 & -1.2 \\ -0.4 & 0.2 & -0.4 \\ 0.2 & -0.6 & 2.2 \end{pmatrix}$                       |
| $\begin{pmatrix} 2 & a & 0 \\ 2 & 1 & -2 \\ -1 & 0 & 1 \end{pmatrix}$  | 2     | $\begin{pmatrix} 1 & 0 & 1 \\ a & 2 & a \\ -2a & -4 & 2-2a \end{pmatrix}$    | $\begin{pmatrix} 1 & 0 & 1 \\ -a & 2 & -a \\ -2a & 4 & 2-2a \end{pmatrix}$    | $\begin{pmatrix} 1 & -a & -2a \\ 0 & 2 & 4 \\ 1 & -a & 2-2a \end{pmatrix}$    | $\begin{pmatrix} \frac{1}{2} & -\frac{a}{2} & -a \\ 0 & 1 & 2 \\ \frac{1}{2} & -\frac{a}{2} & 1-a \end{pmatrix}$ |
| $\begin{pmatrix} -b & 1 & -1 \\ 1 & 0 & 2 \\ b & -1 & 2 \end{pmatrix}$ | -1    | $\begin{pmatrix} 2 & 2-2b & -1 \\ 1 & -b & 0 \\ 2 & 1-2b & -1 \end{pmatrix}$ | $\begin{pmatrix} 2 & 2b-2 & -1 \\ -1 & -b & 0 \\ 2 & 2b-1 & -1 \end{pmatrix}$ | $\begin{pmatrix} 2 & -1 & 2 \\ 2b-2 & -b & 2b-1 \\ -1 & 0 & -1 \end{pmatrix}$ | $\begin{pmatrix} -2 & 1 & -2 \\ 2-2b & b & 1-2b \\ 1 & 0 & 1 \end{pmatrix}$                                      |